

REMARKS

Claims 1 - 3 have been canceled without prejudice or disclaimer of the subject matter thereof. Applicants reserve the right to pursue the subject matter of the canceled claims in the subject application and/or subsequently filed continuing applications.

Claims 4 - 51 have been added.

Claims 4 - 51 are present in the subject application.

In the Office Action of July 25, 2007, the Examiner has rejected claims 1 - 3 under 35 U.S.C. §101, and §112, first and second paragraphs, has rejected claim 1 under 35 U.S.C. §102(b), and has rejected claim 2 under 35 U.S.C. §103(a). Applicants submitted replies in response to the Office Action of July 25, 2007. However, the Examiner indicated in the Office Action of April 30, 2008 that the submitted replies were non-responsive. Accordingly, the subject amendment supersedes the submitted replies and is considered to fully address the issues raised in the Office Actions.

Favorable reconsideration of the subject application is respectfully requested in view of the following remarks.

Initially, Applicants submit herewith a substitute specification and marked-up version illustrating the changes made pursuant to 37 C.F.R. §§1.125(b) and 1.125(c). The application has been amended to include in the specification the subject matter of Appendix A and Appendix B which were incorporated by reference, and to delete those appendices from the originally filed application. Since Appendix B included figures, these figures have been inserted into the drawings as new Figs. 8 - 9 (submitted herewith as new drawing sheets), and the specification has been further amended to include these figures in the brief description of drawings section. Accordingly, the substitute specification includes no new matter.

The Examiner has rejected claims 1 - 3 under 35 U.S.C. §101 as being directed toward non-statutory subject matter. This rejection is moot since claims 1 - 3 have been canceled. However, new independent claims 4, 19, and 34 are respectively directed toward a system (including a computer system), a program product apparatus (including software in a tangible medium), and a method, and are considered to be directed toward statutory subject matter.

The Examiner has rejected claims 1 - 3 under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. The Examiner takes the position that the limitations of a reconfigurable virtual machine having its own instruction set are not sufficiently disclosed, and that the specification appears to be silent on specifically how a virtual machine is reconfigurable, how it has its own instruction set and what the instructions are.

This rejection is considered moot since claims 1 - 3 have been canceled. However, the rejection is respectfully traversed with respect to any of new claims 4 - 51 reciting similar subject matter. In particular, the specification indicates that the virtual machine is reconfigurable (e.g., See Substitute Specification at least at Page 3, lines 9 - 19; Page 4, lines 20 - 22; and Page 19, lines 17 - 20), and that a solution-space configuration unit stores configuration parameters for every aspect of the architecture (e.g., See Substitute Specification at least at Page 8, lines 15 - 16; and Page 24, lines 1 - 9). The specification further states that the operating system implements low-level machine instructions to send to the virtual machine (e.g., See Substitute Specification at least at Page 7, lines 6 - 7; Page 30, lines 1 - 3; and Pages 45 - 50, Table 1), and that the operating system includes a virtual assembler to convert function calls to commands for the virtual machine (e.g., See Substitute Specification at least at Page 8, line 22 to Page 9, line 3). Accordingly, the features of a reconfigurable machine with an instruction set are considered to be clearly enabled by the specification.

The Examiner has rejected claims 1 - 3 under 35 U.S.C. §112, second paragraph, as being indefinite, has rejected claim 1 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,101,346 (Ohtsuki et al.), and has rejected claim 2 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,269,391 (Gillespie) in view of the Ohtsuki et al. patent. These rejections are considered moot since claims 1 - 3 have been canceled.

The cancellation of claims 1 - 3 and addition of new claims 4 - 51 do not reflect the propriety of the Examiner's position with respect to any of the above rejections, but rather, are for purposes of expediting prosecution and further clarifying the subject application in light of the apparent confusion rendered by previous amendments as indicated by the Examiner's numerous comments in the Office Action of April 30, 2008.

In addition, the cited Ohtsuki et al. and Gillespie patents do not disclose, teach or suggest the features recited in new claims 4 - 51.

Briefly, the present invention embodiments are directed toward a virtual supercomputer for generating information processing solutions to complex and/or high-demand/high-performance computing problems. The virtual supercomputer is implemented by a computer system and includes software to implement a reconfigurable virtual hardware processor and an associated virtual operating system. The virtual supercomputer includes a set of operations and procedures that allow the architecture of the system to be easily tailored and adapted to specific problems or classes of problems. The problems include a solution space represented by a node structure, where at least one node includes data for the problem and the nodes are traversed and processed to determine a solution to the problem. A domain application defines the problem and processing for the virtual operating system that manages the node structure, and controls populating the nodes with data and processing the nodes to determine a solution. The virtual

machine is reconfigurable and basically an emulation of a physical hardware architecture with a design tailored for processing the nodes within the solution space (i.e., a Non-Von Neumann architecture), as opposed to register based processing (i.e., Von Neumann architectures) of conventional schemes. The virtual supercomputer achieves processing efficiencies similar to actual supercomputers.

New claims 4 - 51 include independent claims 4, 19, and 34 that each recite the features of: emulating a hardware architecture of a processing system to determine a solution for a problem, wherein the problem includes a solution space represented by one or more nodes with at least one node including data for the problem; configuring the hardware architecture, via a virtual operating system, and controlling the emulation of the hardware architecture in accordance with a user software application defining the problem and corresponding processing to determine the solution; configuring the nodes of the solution space in a topology suitable for determining the solution for the problem; storing and evaluating the data for the problem within the nodes; traversing the topology and processing selected ones of the nodes in accordance with the user software application to determine the solution; and updating the nodes and the topology in accordance with the user software application.

The Ohtsuki et al. patent does not disclose, teach or suggest these features. Rather, the Ohtsuki et al. patent discloses a virtual machine system which includes a plurality of virtual machines by using a computer system of a multi-processor configuration having a plurality of real instruction processors and a real main storage which is divided into a plurality of storage regions to be allocated to the virtual machines, respectively. Each of the virtual machines is so organized as not to make access to the regions allocated to the other virtual machines. When one and the same virtual machine includes a plurality of real instruction processors, invalidation of

entry of a buffer storage of another real instruction processor as conditioned by execution of a predetermined instruction by a real instruction processor is performed only for the other real instruction processor assigned to the same virtual machine as the real instruction processor and is inhibited from affecting the real instruction processors assigned to the other virtual machines (e.g., See Abstract; and Column 4, lines 26 - 57).

Thus, the Ohtsuki et al. patent is directed toward controlling buffer storage of real instruction processors when implementing a virtual machine with a plurality of real instruction processors in order to allow a plurality of operating systems to run on an information processing system. Accordingly, there is no disclosure, teaching or suggestion of a node structure representing a solution space for a problem, a virtual machine with a configurable architecture to process the nodes, and a virtual operating system to manage the node structure and control the virtual machine to traverse the node structure and process nodes to determine a solution for the problem in accordance with a user software application as recited in the independent claims.

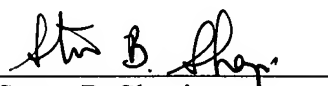
The Gillespie patent similarly does not disclose, teach or suggest these features. Rather, the Gillespie patent discloses a scheduling kernel providing fair share scheduling of several virtual machines by a multi-processor scheduling module scheduling the virtual machines across the several processors of the multi-processor. A virtual machine scheduling module schedules threads of a virtual machine, and provides an independent scheduling policy for a virtual machine. Execution exclusion sets may be created and enforced by an execution exclusion set module to limit execution to a single thread at a time out of any particular execution exclusion set of threads (e.g., See Abstract; Column 4, Lines 9 - 12; Column 5, lines 20 - 37; and Column 6, lines 15 - 20).

Thus, the Gillespie patent is directed toward scheduling execution of virtual machines and the specific threads within those virtual machines. Accordingly, there is no disclosure, teaching or suggestion of a node structure representing a solution space for the problem, a virtual machine with a configurable architecture to process the nodes, and a virtual operating system to manage the node structure and control the virtual machine to traverse the node structure and process nodes to determine a solution for the problem in accordance with a user software application as recited in the independent claims.

Since the Ohtsuki et al. and Gillespie patents do not disclose, teach or suggest, either alone or in combination, the features recited in independent claims 4, 19, and 34 as discussed above, these independent claims and their corresponding dependent claims are considered to be in condition for allowance.

The application, having been shown to overcome issues raised in the Office Action, is considered to be in condition for allowance and a Notice of Allowance is earnestly solicited.

Respectfully submitted,



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